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East Europe Report

SCIENCE & TECHNOLOGY

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EAST EUROPE REPORT

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CONTENTS

CEMA COMPUTER COOPERATION, PROBLEMS DESCRIBED

Application of British Technology

Warsaw INFORMATYKA in Polish No 3, Mar 84 pp 5-8

[Article by Jozef F. Lewoc, Wroclaw: "Quo Vadis, Uniform System?"]

[Text] The common comments concerning the performance of computers of the Uniform System [JS] are at variance with statements that the system is a model of appropriate and well-implemented approach to computerization problems in Poland and CEMA nations. On the other hand, the quality of Polish computer equipment is highly valued worldwide, as evidenced, among other things, by the scope of exports.

Indicative Example

In the framework of the Interschool Computer System [MSK] an experiment has been conducted to compare the performance of similar operations in TSO + TCAM systems using the R-32 computer and the Minimop using the Odra 1325 computer. TSO was chosen, because among the various available systems it is most convenient for the user at a Uniform System terminal. The TCAM system component, in the standard configuration, is a logical complement to TSO.

Other standard systems for control of teleprocessing [4] and access methods [14] either do not provide similar user capacities or are unavailable for use with the R-32 computer (VTAM). Minimop was the only system with such application used at Wroclaw Polytechnic (in multiple access student workshops).

The experiment was conducted in four student sessions; two were supervised by TSO (programs written in Pascal and Fortran languages) and two tests with the use of Minimop (Fortran programs). The results of the tests are discussed in reference [2]. The findings were surprising: the costs of operations on the R-32 were tens of times higher than on the Odra 1325. The response time of the R-32 was similar to expected values (about 30 s), having a high maximum level (actual 435 s; theoretical, many hours), with a relatively efficient service of "dumb" instructions (those requring little procesing time) as well as of fast-processed instructions.

The time distribution of response with the Minimop system was close to normal, with the expected value of 2 s (less than 1 s if the activation of remote printer drive is subtracted) and low maximum value (measured 7 ; theoretical about 30 s), with eight active terminals (seven terminals for the TSO). The parameters were selected in keeping with the manufacturers recommendations [5, 15].

The example confirmed the hypothesis that the system software of the R-32 fails to provide the desired effects for the user. In this case, most of the fault lay with TCAM and TSO drive. The latter was poorly described in reference [5], although it has been better documented in other publications [10]. The documentation of reference [10], however, is not easy to come by and few users have had the opportunity to read the author's polite statement on p. 25: "The optimal separation of the drive (from the rest of the TSO) is intended for its easier exchange or modification." This statement indicate the author's doubt as to the performance of this device. The TSO system, despite its attractions, has not received universal acceptance.

A closer look is called for at the root cause of the poor performance: the operative system OS/MVT [8], because TSO and TCAM are only superstructures built upon it.

A Little History

During the Winter Institute of the Computer Network organized by the Information Science Outfit of the Institute of Technical Cybernetics of Wroclaw Polytechnic, I met the representative of the Cambridge University Computer Laboratory (CL), who is one of the authors of the communication processor in the Phoenix system [7]. This specialist provided specific assistance that was put to use in developing the communication subnetwork MSK.

A year later, on the invitation of the Computer Center of Warsaw Polytechnic, another two representatives from CL visited Poland and brought the basic documentation of the Parrot system [19], which included the software of the main processor and the modifications of the operating system OS/MVT that replaced TCAM. The CL representatives allowed the reproduction of the software free of charge and trained about a dozen users in operating the Phoenix system, including the modifications that have been introduced to OS/MVT operating system. In addition, the computer center of the Wroclaw Polytechnic received a series of technical reports from CL (without reproduction rights). These materials and our own conclusions drawn from a reading of the documentation of the Uniform System and practical experiments are presented in the evaluation of the operative system OS/MVT given below.

Assessment of the Operating System OS/MVT

One company [2] is known to prosper by selling services for readjustment of operating parameters of the OS/MVT. This results in about a 50 percent increase of processing capacity of the IBM 360. This is a clear indication

of adequate and clear documentation offered by the manufacturer. There is no doubt that this is a major operating system. The greater the system, however, the better its documentation should be, and the user must be given a simple presentation of rules to handle such a giant.

Increasing the parameters, however, in and of itself does not lead to a drastic improvement of system performance. The example given earlier, however, indicates a considerable waste of hardware capacity.

Management of the Disk Memory

A major waste results from poorly resolved management of the disk memory [9, 18], especially obvious in remote access systems. Each disk volume is described in the disk space of VTOC, consisting of at least two blocks. Random access involved finding the blocks of the first F1, containing a description of a set of maximum three disk spaces, although 13 more could be described in the other block F3.

The free disk space is described by a special chain of blocks of VTOC F5. The VTOC itself is described by the special block F4.

The memory management programs (generation, expansion, reduction and elimination of files) are separate, although many of their functions are identical. They involve redundancies. Each time F4 is read and recorded, all of F5, F1 and F3 are reprocessed, so that the system runs through the entire VTOC to test for a repeating name.

In a typical situation, about 200 disk transmissions are performed per one transaction of the memory management. In addition, what appears as improvements of the disk system, such as suballocation or index-sequential organization, makes in the multiprogram system a longer file access time necessary. In the software mentioned above, CL has changed the disk memory management program while retaining the internal interfaces (and data structures). The disk space is described by a bit table in the working memory. Verification of names has been eliminated through introduction of other safeguards. The program code is concise and resides in the working memory. After a system breakdown, the table describing the disk space is regenerated by a complete scan of the VTOC (within approximately 1 s). The destruction of disk files in the case of system breakdown has also been ruled out.

As a result of these modifications, the processor operation time has been reduced by approximately nine times, and the time of performance of typical operations, such as Allocate and Scratch, has been cut down by about 19 times.

Reserve Allocation and Ordering of Task Performance

The OS/MVT + TSO claims to set no limits on access to reserves by tasks or user sessions in time-shared mode. This only seems so, because after the input of OS/MVT, TSO + TCAM and three areas of 110 K words each on the R-32

--with the maximum memory of 1 MB supplied by the manufacturer--only 32 kB remains for input assignments. This is insufficient even for placing large compilers, so that an effective utilization of the processor through application of multiprogramming is out of the question.

In the experiment, the processor was used for the second-plan assignments less than 2 percent of the time, despite the fact that complete and appropriate input was prepared for the entire period of the test. Only 10 percent of the time was spent on primary type assignments (processing).

The absence of limitations can please the user, but the resulting processing costs are less enjoyable, totalling 5,000 to 10,000 zlotys per computer operation hour. Limitations to the size of sessions have been imposed by CL: the normal exchange region with a capacity of 34 kB; longer programs can be placed in a different region without exchange. The system of ordering of tasks is based on so-called unit price assigned to projects, which decreases with the growth in total actual utilization of reserves by a project. As a result of this principle, users are forced toward a sparing use of the the computer, with obvious benefits.

The order of tasks in OS/MVT with the HASP systems is set on the basis of a total number of tasks being assigned. As a result, the time is scheduled (as was done in the experiment). When a specific assignment is to start is not known in advance. CL qualifies all possible assignments for immediate performance (usually, these are more than 85 percent of the assignments [7]). The remaining assignments are allotted three hours or a time at user's request (such as during the night). The user is warned of the long operation time and may cancel the work under these conditions.

The OS/MVT lacks the mechanisms which would create an incentive for a sparing use of disk memory. Many users waste valuable reserves, further limiting the possible utilization of the system (the need for frequent change of disks). Part of the blame for that lies with the absence of adequate protection of files. At CL, combined file areas are used, and there are safeguards against unauthorized recording and the built-in price calculations that create incentives for sparing utilization of the disk memory.

The allocation of reserves applied by CL is based on analysis of the individual users, rather than departments, leading to more econimical utilization.

In some major projects, such as the application of the queuing theory to studies of computer systems (e.g., reference [11]), the basic principles of economy are often disregarded, and no adequate consideration is given to the required probability values.

One is surprised at the absence of examples given in the basic monographic work on probability calculus [6], which indicates high values of variation compared to expected values. OS/MVT + TSO confirms this regularity.

Fragmentation of Memory

The OS/MVT structure allows placing an arbitrary assignment in an arbitrary field of the working memory, but it must be performed only in the memory into which it was loaded. This leads to fragmentation of memory, which is discussed in important studies [13] and which, in my opinion, is a consequence of a simple error in software design and/or hardware design: the poor utilization of the mechanism of protection of memory by using the keys that are not changed dynamically.

In CL, the waste caused by memory fragmentation is partly surmounted through the use for operation of "gaps" between the fields of second-plan assignments [16]. This allows to slightly increase the number of user sessions conducted simultaneously. Yet, CL did not have to resolve this problem basically: its working memory has been increased from 1 MB to 4 MB, and a large part of system workload consists of short tasks (editing and implementation of short programs by students). In Poland, second-plan assignments constitute the bulk of operations performed by computers in the uniform system, and elimination of memory fragmentation is especially important.

Software Unreliability

OS/MVT features errors that cause system breakdowns and the need for reloading, which involves, among other things, destruction of disk files. At Wroclaw Polytechnic Computer Center, so-called system breakdowns occur with a frequency of at least one per day. CL has not resolved this problem but has managed to reduce its detrimental consequences. The disk memory management program mentioned earlier has safeguards against destruction of the disk files, although the losses caused by system loading are decreased through the application of a rapid standard input program (fast IPL).

With more than a hundred R-32 computers installed in Poland, these shortcomings should be spotted, which I believe would not be difficult to attain after a close scrutiny of the inner workings of the OS/MVT (at least in the suspect elements!). It would also be possible to develop a hardware-software system of automatic updating that would minimize the consequences of hardware and software malfunctions. Practice confirms that in that case detailed understanding of the operative system would not be necessary [3].

The drawbacks of the OS/MVT operative system mentioned above are partly responsible for the negative views of the Uniform System computers. As far as theory or documentation is concerned, everything is in order. But then, in practice, the verbal descriptions are shown to be either incorrect or incomplete. By that time, however, it is too late to act. The system has been developed. It has a large software system that must be put to use.

About 120 R-32 computers are currently operational in Poland in different configurations, including gigantic information systems "on legs of clay," as

the configuration with the memory of 12 or even 256 kB is described in the vernacular. They represent investments of about 10^{10} zlotys but produce lower effects than the same number of computers of the Odra 1300 family, which costs many times less.

The Continuing Course of History

Having materials from CL and the access to complete source programs, I made an attempt at initiating the introduction of a OS/MVT + TSO + TCAM operating through an informal small group at three institutions:

--an educational computer center;

--a large general access computer center;

--a computer system supplier.

The purpose of this project was mainly to train personnel capable of mastering such a change at many user institutions and especially to develop new software or hardware modifications for the Uniform System. Due to a lack of real interest on the part of these institutions, after attempts were continued for a year and a half our group gave up on the introduction of changes developed by CL and limited its activity to replacing TCAM with Parrot [1] and changing the TSO drive, which is necessary for effective operation of the network systems. We resigned from the efforts, because it was impossible to find the financing to the tune of a several million zlotys to pay for the cost of the machinery and labor and the acquisition of software.

The lack of interest in what would seem a valuable initiative from a general national point of view is due to the following reasons:

- In the absence of proper regulations, the general access computer center's performance is estimated according to the hardware utilization time rather than the number of actually performed assignments [20]. As a result, the more expensive the service to the users, the better it is for the center.

- The computer supplier is concerned with selling new systems rather than improving the efficiency of previously supplied systems, because this limits its sales market.

- The educational center is self-sufficient and conducts its activities in the same way the general access computer center does, by selling its services.

In the meantime, a new group has been formed whose managers made it possible to carry out the modifications of the OS/MVT system. Hopefully, this work will bring forth real results in the coming year. This group should be supported in its activities, because it is irrelevant whether the work is done at Wroclaw or at other locations. The facts confirm that it should be done.

Possiblities of Further Progress

The problem of machines of the Uniform System, and in the broader picture, the future of (for Poland's scale) large computers, is currently a matter of concern to many individuals and institutions. Theoretically, the following decisions could be made:

1) discontinuance of the Uniform System computer manufacturing and development of the Odra-1300 series;

2) discontinuance of the Odra-1300 series and developing a Uniform System and

3) continuing to make Odra-1300 series and at the same time improving the utilization parameters of Uniform System machines.

I believe that the third alternative should be adopted (according to the views of users, who attended the section on digital machines and systems of the Electronics Industry Conference at Wroclaw [17]); we should think of ways to improve the user parameters of the Uniform System machines. This can be achieved in three ways:

1) initiating the production of new Uniform System models with virtual memory and other improvements that would allow working under the supervision of the OS/VS operative system, while discontinuing the current changes in the R-32 software;

2) without developing new models, modernize the system software of the R-32 ;

3) prepare to produce new Uniform System models and simultaneously modernize the R-32.

The first alternative means giving up on utilization of the large investments already frozen into the R-32-based systems. A trade-off alternative 3 seems preferable, although it calls for a more detailed definition of solutions and areas where the R-32 should be modernized. The following two approaches are conceivable:

--developing an integrated operative system from scratch while retaining the internal interfaces ,

--gradually phasing out the "bottleneck" in OS/MVT.

The latter approach is conservative, but, as at CL, it yields sizeable effects for a relatively small cost.

In any case, the size of investment frozen in the system and the potential effect of modernization of the existing software calls for the earliest possible initiation of these projects.

* * *

The problems presented in this article can be stated in the form of the following recommendations:

- the operative system OS/MVT (and TSO + TCAM) makes it impossible to utilize the capacities of the Uniform System hardware effectively;
- OS/MVT should be modified, gradually eliminating its "bottlenecks";
- the processing technology and the payments principles should create incentives for users for an economical utilization of the computer reserves;
- the evaluations and estimates of performance of computer centers and computer system suppliers should be changed to create incentives for increasing the effectiveness of utilization of hardware;
- a systematic effort should be instituted to improve the user parameters of the Uniform System machines, while continuing the manufacture of the Odra-1300 series;
- the production of new Uniform System models does not mean that intensive modernization of the R-32 should be stopped.

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CEMA Computer Hardware Cooperation

Warsaw INFORMATYKA in Polish No 3, Mar 84 p 26

[Article by Krzysztof Urbaniec: "Council for Applications of Computer Hardware"]

[Text] The cooperation of CEMA nations in the development, manufacture and use of computer technology was started in 1969 under the aegis of the International Cooperation Commission in the Area of Computer Hardware [MKETO].

The activities of the commission encompassed major phases of computer hardware implementation, starting from research work to design to development of manufacturing technology and the actual production of technical facilities and system implementation, including their application in services (as well as economic aspects). The executive organs of MKETO are the following councils: the Council of Chief Designers of the Uniform System, the Council of Chief Designers of SM Systems, the Economic Council, the Council for Applications, the Council for Comprehensive Services, the Council for Elementary Base and Normalization and also the Temporary Working Group on Technological Equipment.

The issues of user programming and user applications are within the terms of reference of the Council for Applications of Computer Hardware instituted in 1976. The major objective of the council is to implement a uniform technological policy and coordinate the cooperation of CEMA nations in the applications of JS and SM computers. Coordination encompasses the following trends:

- definition of major areas of the national economy where the applications of computer technology produce economic and social effect and cooperation in preparing long-terms plans and forecasts of JS and SM computer applications;

- development of prototype systems, design solutions and user programs, as well as experimental testing of these products on selected objects;

- publication of methodological materials and recommendations on the prototype systems developed in the MKETO framework, as well as design solutions and user software;

- development of methods and means of automatic design for automated systems;

- development of facilities for improving the efficiency of software design and automation of programming work;

- development of principles of specialization in the area of object- or problem-oriented systems, with taking into consideration the interests, capabilities and experience of the individual member nations;

- development of draft regulations for exchange of user software packages and designs of prototype systems (in the MKETO framework).

The principal form of activity of the council is implementation of projects covered in the so-called Uniform Cooperation Plan [JPW]. The main two types of work are: research projects and development of user software packages. The uniform planning that was adopted in 1981 and which covers the period until 1985 includes about 190 projects: Poland is responsible for 23 projects as the leading nation and takes part in another 63 projects as a coperformer.

The supervision of the implementation of these projects is provided by the working organs of the council--namely:

--the Section for Systems and Methodologies;

--the Section for Systems of Design Automation;

--the Temporary Working Group for Automated Systems of Industrial Process Control;

--the Temporary Working Group for Design Technology and Tools;

--the Temporary Working Group for Personnel Training.

The projects concerned with the automation of management systems are implemented without supervision of any special working organ.

Besides the joint implementation of research and development, the Council for Applications of Computer Hardware also conducts organizational work, which has lately been focused on development of a market for user software in the CEMA member nations and introduction of cooperation based on contracts or trade agreements.

The key aspect of the council's activities is the development of effective applications of information science and computer engineering, especially the development of information systems and software for JS and SM computers. The council has promoted the development of socially and economically effective

--computer applications in Poland, which is the main goal of activity of the Polish section of the council; other objectives are:

--cutting costs of development of computer applications in Poland,

--promotion of export of both software and complete systems through implementation of projects and organization work,

--accumulation and supply of data on foreign development.

In coordination of current activities, the Institute of Engineering Industry Organization plays a major part in this activity as the seat of the secretariat of the Polish section of the council. In attaining the major objectives, it is making use of the capabilities, as suggested by its assignments and powers involved in the applications of computers in metallurgy and engineering. The institutes cooperates with such organizations as Elwro, IKSAiP, ISS, IMM, Mera and MimERA. Other outfits from metallurgy and engineering industry take part in the work of the council, including the Institute of Metal Cutting and OBRTEKOMA. Of the organizations working outside the framework of the Ministry of Metallurgy and Engineering are: CPiZI, CEKAR, BISTYP, Warsaw University and enterprises of the Polish Academy of Sciences at Bytom.

The activities of the Working Group for Personnel Training are different. This work is conducted mainly by SKI and higher schools such as Wroclaw Polytechnic, Wroclaw University, Poznan Polytechnic, Torun University and Rzeszow Polytechnic.

Of the specific projects, the following deserve mentioning:

- the Institute of Metal Cutting is developing a technological data base for optimization of the metal-cutting parameters (together with software for JS computers); applications of these systems are expected to lower costs at enterprises in several branches of the industry;

- OBRTEKOMA is working on a software package for JS machines using a modular method; this will help modernize the design calculations done in development of machines;

- at Mera-System enterprises, a computer system has been developed that serves as a programmer's aid (in programming for JS computers); the system is expected to provide a reduction in computer application costs;

- ISS is developing software for a network of JS and SM computers.

[Inset] The Polish Section of the Council for Applications for Computer Hardware has the following membership composition:

- the Polish representative at the Council, Docent Krzystof Urbaniec, D.Sc. (Eng.) (Institute of Engineering Industry Organization, Orgmasz, Warsaw);

- Deputy Representatives of Poland at the Council Zbigniew Substyk, Eng. (CPiZI, Warsaw) and Janusz Sieczko, Eng. (Mera-System, Warsaw);

- Current Acting Secretary of the Polish Section of the Council Eugeniusz Kruk, Eng. (the Secretariat of the Polish Section of the Council, IOPM Orgmasz, 00-921 Warsaw 53, ul, Krucza 36, tel. 21-36-00, telex 812720);

- Representative of Poland at the Section for General Systems and Methodology Docent Jerzy Marszaiek, D.Sc. (Eng.) (IKSAiP, Wroclaw);

- Representative of Poland at the Section for Systems of Design Automation Jerzy Sikora, Eng. (IOS, Krakow);

- Representative of Poland at the Temporary Working Group for Automated Systems of Industrial Process Control Professor Andrzej Grzywak, D.Sc. (Eng.) (ISS, Katowice);

- Representative of Poland at the Temporary Working Group for Design Technology and Tools Marian Skupinski, Eng. (Mera-System, Warsaw);

- Acting Representative of Poland at the Temporary Working Group for Personnel Training Barbara Szymanska (SKI, Warsaw).

R-35 Computer Shortcomings

× Warsaw INFORMATYKA in Polish No 4, Apr 84 pp 26, 27

[Article by Teresa Wilczec: "R-35 in Practice"]

[Text] An advertisement recently carried in INFORMATYKA (No 11/83, p 36) is entitled "R-35: A Novelty of the Uniform Systems." Since R-35 computers have been working in Poland for several years, it is appropriate to look at how the advertisement and data relate to the actual situation.

The R-35 is not a supernovelty (for instance, the R-60 is more modern); the R-35 machine that I am familiar with has been in operation since 1980. Experience with this computer gives less grounds for optimism than what the advertisement copy might suggest.

Each prototype, of course (and the R-35 machine I have in mind is one), typically has a relatively high failure rate. It is no secret that the R-35 breaks down often and sometimes very often. Even apart from this "infantile disease," there are aspects that should be pointed out, however.

The basic configuration of the EC 1035-01 includes the operator keyboard, with an electric printer, Consul. This device, as shown by experience, breaks down very often, and its communication with the system is slow and inefficient for use. A better solution is connecting the system to the display screen, as was in fact done at the center I am talking about and is effective.

The advertisement mentions that the manufacturer supplies disk units with a capacity of 100 MB. This seems to suggest that in this case the type of communication channels between disks and central unit has been modified. In the basic configuration, the messages are exchanged in a serial mode, and, therefore, they are slow, so that working with disks of 100 MB is practically impossible (extremely inefficient). Generally, system communications in the R-35 are slow and especially the operations that have to be repeated in communication greatly increase the total time of program execution. The speed of the processor is comparable to that of the R-32.

The range of operation conditions described in the ad seem overstated (5-40°C, humidity, 40-95 percent). In the actual technical documentation supplied by the producer, it is stated that the central unit should work at temperatures of 18-20°C and humidities of 55-60 percent. These limitations have been confirmed in practice. In effect, even with proper air conditioning, the machine breaks down in the summer much more frequently.

The mentions of ramified technical software and modern system programming are an overstatement. Doubtless, even the best test is incapable of revealing all possible failures. Technical software regrettably does not provide the capability for identifying the fluctuating (temporary) errors. The system software is even worse. Quite often, items described in the system software

which correspond to the IBM 370/Ryad simply "do not work."

There are currently about a dozen versions of the system software. When the R-35 computer mentioned above was purchased (which was in 1980), the manufacturer was offering the second version. After long and unsuccessful struggles, the seventh version is now advertised, which does not expand the capacity of the operative system but is improved because it fits better the documentation even though it also contains errors. Incidentally, it was only in the sixth and seventh versions that the possibility of remote processing (new network operation) was first provided.

The operating system of the R-35 is no longer OS/VS but OS/SVS. This system is not compatible with the operating system VS (system with complete virtualization of memory) used in the 370 family, but it is similar to the OS/MVT system (multiprogramming with a variable number of assignments). The OS/SVS producer calls a system with a variable number of assignments using the virtual memory a multiprogramming system. Without going into detail, it should be stated that the OS/SVS is less effective than OS/VS.

The basic software of the R-35 includes the compilers of Assembler, RPG, Algol, Cobol, Fortran and PL/1 languages. Some believe that the Algol compiler is not elaborated well and not used in practice. Fortran compiler is a minimal library of standard mathematical routines. The error diagnosis in this language is incomplete and often ambiguous. Some mathematical operations (such as exponentiation) are implemented ineffectively. Assembler and PL/1, however, cause no concern. Besides, transfer of the IBM 370/Ryad software is laborious.

*

Now, a few general comments.

Difficulties caused by the operation of the auxiliary equipment produced by participants of the Uniform System show that certain things have been passed by in silence. The advertising copy describing the Digigraf graphic equipment, for instance, says that it can operate on line with the computer. The manufacturer of the processor (R-35), however, does not authorize this linkage under the threat of guarantee cancellation.

The Digigraf software library is scarce. Incidentally, not all of the graphic procedures of this software purchased by the computing center cited above were free of error. One wonders why such a library was created, while for several years, users of graphics equipment have been exchanging efficient software packages imported from the West. Besides, these packages are compatible with various kinds of software developed by computer amateurs.

The Uniform System was created to make us independent of the Western producers of computer hardware. Why is it then that a memory block of the Digigraf is manufactured entirely in the United States, and in case of an emergency cannot be directly replaced by anything available on domestic markets?

There is also the question of service and procurement of spare components. The situation is not good in that aspect either. This is due to difficulties in the general economic situation in the country. But many shortages, as shown by experience, are caused by sheer negligence. Would some authority took a look at the process of conclusion and implementation of contracts at individual purchases of computer hardware, because looking from below one gets the impression of utter chaos. For instance, the time for delivery of replacement components in an emergency situation has been established in one contract at 25 days (!), and even this condition is notoriously not fulfilled.

The task of the representative of foreign trade concerned with information hardware is to mediate the contacts between manufacturers and users and to focus on the latter's interests. Yet, letters to manufacturers are known to have been lost by our middleman, i.e., the Metronex enterprises, which resulted in months of delay in guaranteed repairs. For about a year, Metronex has been promising to set up a service outfit for the Digigraf ...

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Aside from the "reality" of the R-35, it seems that the facts reported here are no exception. Although I used as an example one computering center and one copy of the Uniform System computer, I have a suspicion (confirmed by contacts with other users of the Ryad system) that these examples were not instances of an exceptional "informatic" bad luck.

The Ryad system is definitely obsolete for certain applications and is extremely uneconomical in its operation. In a report that was published in INFORMATYKA (No 10/83, p. 35), one of the participants at a conference of the European Center for Nuclear Research voiced the following concern: "How can physicists write good programs according to proper prototypes if every day they have to deal with the worst software ever developed for IBM operating systems?" This opinion gives food for thought, not necessarily to physicists, but especially to us who every day have to struggle with computers of the Uniform System, patterned primarily after IBM ...

Polish-Soviet Computer Cooperation

Warsaw TRYBUNA LUDU in Polish 18 May 84 p 7

[Communication by Polish Press Agency [PAP]: "In the Area of Computer Hardware: Development of Polish-Soviet Cooperation"]

[Text] Moscow (PAP). A Polish-Soviet symposium on cooperation in development and improvement of computer hardware electronics has coompleted its sessions in Moscow.

The meeting was the first step in the implementation of a long-term program of development of economic and scientific-technical cooperation between Poland and the USSR until the year 2000 signed during his visit in the USSR by Wojcjech Jaruzelski.

The bilateral conference provided an opportunity for informing the Soviet side of the trends in development of the microcomputer Mera-60 system and also about the new Polish designs that we will offer to Soviet customers in 1985. The export to the Soviet Union, which in 1984 will total 450 computers, is expected to grow in the coming five years to about 1,000 systems annually.

9922
CSO: 2602/26

SOCIALIST COUNTRIES COOPERATE IN COMPUTER R&D

Sofia SPISANIE NA BULGARSKATA AKADEMIYA NA NAUKITE in Bulgarian No 2, 1984 pp 67-69

[Article by Krum Lazarov: "International Scientific Cooperation: Higher Level of Cooperation Among Scientists in Socialist Countries in the Field of Computer Technology and Information Science"]

[Text] The problems related to improving and raising the level of cooperation among scientists from socialist countries in the field of computer technology and information science have always been topical. The Discussion Commission on Scientific Questions of Computer Technology has worked for over 29 years, seeking their resolution. Scientists from many countries take part in its various activities. Scientific conferences and working group sessions have been the main working format of the commission thus far. At these sessions, a number of concrete scientific and technical problems have been solved, surveys of the state of certain scientific managements have been elaborated, and technical assignments for creating program packages have been developed.

Contemporary scientific achievements have also raised the level of cooperation in the field of computer technology and information science. The president of the Academy of Sciences of the USSR, Academician A. P. Aleksandrov, stressed this question in particular at the meeting of the leaders of the academies from socialist countries, held in Moscow in May 1983. On the initiative of the Soviet academy, these questions were also discussed at the session of the chief scientific secretaries of the academies of sciences in the socialist countries, which was held in Budapest from 4 October to 6 October 1983. During this session, it was decided, based on the proposal of Academician Bl. Sendov, vice president and scientific secretary of the Bulgarian Academy of Sciences, that the first conference for the establishment of a Coordinating Council on Computer Technology and Information Science should take place in Sofia from 16 to 18 December 1983.

Despite the short period of time, the leadership of the academies of the socialist countries and the appropriate institutes which are directly involved in dealing with these problems carried out intensive and purposeful preparation. The leadership of the Bulgarian Academy of Sciences is responsible for a great bulk of organizing the preparations and processing the materials received in a timely way. A well-ordered organization for carrying on this

important activity was created. The operations office included, in addition to collaborators from the international department and other departments, experts from various institutes, which were responsible for concrete tasks. The work on preparing the session was conducted by the vice president and chief scientific secretary of the Bulgarian Academy of Sciences, Academician Bl. Sendov. Thanks to the efforts of the team, the session took place at the scheduled time and followed the agenda which had been accepted in advance by the participants.

A total of 52 scientists, of whom 38 were foreign, took part in the first session of the Coordinating Council on Computing Technology and Information Science. The following delegations attended: the delegation from the National Center for Scientific Research of the Socialist Republic of Vietnam, led by its vice president, Prof Fan Din Zieu; the delegation from the Academy of Sciences of East Germany, led by presidium member and chair of the Department of Mathematics and Cybernetics at the East German Academy of Sciences, corresponding member M. Peschel; the delegation from the Academy of Sciences of the People's Democratic Republic of Korea, led by the chief secretary of the Department of Computer Technology of the Academy of Sciences of the People's Democratic Republic of Korea, Dr So Un Zen; the delegation from the Academy of Sciences of Cuba, led by Prof Dr J. Balladeres, director of the electronics section at the academy; the delegation from the Academy of Sciences of the Mongolian People's Republic, led by the scientific secretary of the academy, L. Dorzh; the delegation from the Polish Academy of Sciences, led by its deputy scientific secretary, Academician M. Nalecz; the delegation from the Academy of Sciences of the USSR, led by its vice president, Academician E. P. Velikhov; the delegation from the Czechoslovak Academy of Sciences, led by its vice president, Academician P. Ris; the delegation from the Hungarian Academy of Sciences, led by the academy's deputy scientific secretary, corresponding member I. Lang; and the delegation from the Bulgarian Academy of Sciences, led by its vice president and scientific secretary, Academician Bl. Sendov.

Responsible workers in the apparatus of the Central Committee of the Bulgarian Communist Party participated in the conference, as did the vice president of the State Committee for Science and Technical Progress, Comrade L. Lazarov. The scientists listened to an in-depth report presented by the president of the Discussion Commission on Scientific Questions of Computer Technology and Informatics, Prof Yu. Kulikovski. He made a detailed analysis of the commission's work thus far. It was pointed out that although there is a broad range of commission interests, including many scientific problems which require the participation of highly trained specialists and collectives, there are still many important trends which remain outside its purview. The leadership of the commission thinks that, in order to achieve broader and more complete coordination in international cooperation in the field of computer technology and information science, it recommended that a specialized coordinating organ be created which, together with the commission, would be able to include all areas of basic scientific research. Furthermore, Prof Kulikovski proposed some directions for future work which could apply to the contemporary level and expected tendencies in the development of computer technology and information science in the future. He pointed out in his report

that the experience of international cooperation in other areas of science confirms the effectiveness of the functioning of international institutes and centers. The leadership of the discussion commission believes that the establishment of a coordinating council for this area will also make it possible to create such institutions within the framework of scientific cooperation in the field of computer technology and information science. Prof Kulikovski's report caused animated discussion. The representatives of all delegations expressed their opinions and offered suggestions on this question. The work of the Discussion Commission on Scientific Questions of Computer Technology and Information Science was evaluated highly; it was reported that the commission had successfully solved a number of questions related to the fundamental and applied problems of computer technology. Favorable conditions were created for preparing and improving the training of young scientific workers in this area. It was noted, however, that in order to raise the quality of work in this area to a higher level, new organizational forms and significant material resources are needed. The establishment of the coordinating council in this regard will make it possible to use the material resources of the different socialist countries more correctly and purposefully for attaining the common goals. The conference examined the possibility of creating an international research center in the field of fundamental and applied research on the development of problems related to computer technology and information science. The past experience of scientists at the academies of sciences in the socialist countries, accumulated in the development of other international programs for complex scientific and applied research, should be used in elaborating the statute of this international research center. Particular attention was devoted to the fact that the final results of fundamental and applied research in computer technology and information science should be directly linked to the industry of the country involved. In solving these problems it is necessary to provide well for material resources, to attract highly trained specialists, to ensure specialized and high-quality equipment for scientific research, to allow possibilities for jointly creating an international computer network, and to find more contemporary and flexible forms for the exchange of specialists. The conference recommended that the leaders of the academies should acquaint the appropriate governmental organs with its recommendations and resolutions and to present their own proposals for establishing appropriate national organizational structures and projects for signing related agreements and contracts which would ensure the execution of the adopted program. A decision was made to develop cooperation between socialist countries in the development of a concept for new generation computer systems.

At the conference, suggestions were made with respect to the functions, tasks, and composition of the International Coordinating Committee and the plan for joint fundamental and applied research, as well as the project for agreements and treaties between socialist countries for conducting fundamental and applied research and creating a new generation of computer technology.

This 2-day conference was characterized by its businesslike, purposeful, and concrete conduct. Academician E. Velikhov, the vice president of the Academy of Sciences of the USSR, was elected president of the Coordinating Council

on Computing Technology and Information Science for a period of 2 years. It was decided to ask the president of the coordinating council to organize a second conference of the council, to be held in May 1984 in the Soviet Union. The newly created coordinating council made concrete decisions on all questions related to the realization of the program and set determined schedules for its fulfillment. Different delegations presented additional proposals to be examined by the second conference of the coordinating council.

The conference took place in a spirit of complete understanding and with a friendly and creative atmosphere. The participants cordially thanked the Bulgarian Academy of Sciences for taking the initiative for holding the conference in Bulgaria and for its good and smoothly functioning organization during the course of the conference.

At one of its sessions, the Presidium of the Bulgarian Academy of Sciences discussed the paper of the vice president and chief scientific secretary of the Bulgarian Academy of Sciences, Academician Bl. Sendov, concerning the results of the first conference of the Coordinating Council on Computer Technology and Information Science of the academies of sciences of the socialist countries, held in Sofia on 16 and 17 December 1983.

The Presidium of the Bulgarian Academy of Sciences fully accepted the paper presented by Academician Bl. Sendov and approved the activity of the delegation from the Bulgarian Academy of Sciences. The presidium also approved the protocol of the conference and nominated Academician Bl. Sendov as a plenipotentiary of the Bulgarian Academy of Sciences on the Coordinating Council for Computing Technology and Information Science.

12334
CSO: 2202/13

INVENTIONS, NEW TECHNOLOGIES APPROVED BY ACADEMY OF SCIENCES

Invention Using Ultrasound

Sofia SPISANIE NA BULGARSKATA AKADEMIYA NA NAUKITE in Bulgarian No 2, 1984 pp 93-94

[Article: "Automatic Stand for Ultrasound Control of Wrapped Instruments"]

[Text] The following inventions have been created at the Institute for Metal Studies and Metal Technology at the Bulgarian Academy of Sciences: registration No 40144 -- Method for Determining Contact Pressures in Wrapped Instruments; registration No 43653 -- Device for Measuring Contact Pressures in Wrapped Instruments, by a designers collective which includes Prof Khr. Kortenski, Associate Prof M. Marinov, senior scientific associate M. Mikhovski, scientific associate G. Pushev, engineer V. Manolova, and engineer G. Kostov. The inventions have been licensed for distribution in England, France, West Germany, Italy, Switzerland, Sweden, Belgium, the Netherlands, Austria, the United States, Canada, Japan, the USSR, East Germany, Czechoslovakia, Poland, and Hungary.

With contemporary methods for shaping metal, the deformation instruments operate under very heavy operating conditions. The cyclically operating working pressures in some cases reach up to 2500-3000 MPa, which are often distributed very unevenly along the height of the instrument. Because of this, matrices are often broken, which leads to the destruction of the swage, breaking of the matrix and swage block; as a result, expensive equipment is forced to sit idle, out of order. If the losses in steel for tools (and there is a shortage of this), in the wage fund and in production not manufactured during the time the equipment is being repaired are counted up, it becomes clear how important correct wrapping and measuring are. The former is impossible without first knowing the actual size and nature of pressure distribution in wrapped instruments.

Reliable operation of wrapped instruments under production conditions requires using a method which permits express control of the preliminary pressures during the wrapping, with high precision satisfactory enough for the needs of production. The non-destructive methods used practically for determining contact pressures in wrapped instruments give only qualitative information about their distribution, without the necessary reliability in most cases.

For the first time in the world, an automatic stand for non-destructive determination of contact pressures on pressed junctions has been developed on the basis of the inventions mentioned above. The automatic stand, which works according to this method, has an application in express qualitative control of the preliminary contact pressures at plants which manufacture and use wrapped instruments. The development of the stand has a concrete application; however, it could be expanded slightly to include any given pressed junctions.

The inventions could find tremendous application in scientific research activities for studying the processes of pure relaxation of pressures, and in tests for cyclical durability of pressed junctions.

This development has been implemented at the Izgrev plant in Oryakhovo. It is expected to be expanded and implemented at other plants around the country -- at the Gocho Grozev plant in Plovdiv and others. A number of foreign firms are also interested in this development from a commercial point of view. The automatic stand for ultrasound, non-destructive control of contact pressures in wrapped instruments was awarded a gold medal at the International Fair in Leipzig in 1983.

Device for Measuring Oxygen

Sofia SPISANIE NA BULGARSKATA AKADEMIYA NA NAUKITA in Bulgarian No 2, 1984 p 94

[Article: "Betatest OM-200 Oxymeter"]

[Text] At the Central Laboratory for Electrochemical Power Sources (CLEPS) at the Bulgarian Academy of Sciences, a digital electronic device for measuring traces of oxygen in superfine and inert atmospheres has been developed. The device is original, there has been no equivalent development within the member nations of CEMA. It is protected by six patents (registration Nos 36498, 51029, 51030, 51111, 55166, and 55167) and is licensed in the USSR, East Germany, Czechoslovakia, Hungary, and Romania. The design collective for this development is led by scientific associate P. Andreev and scientific associate V. Manev.

The digital oxymeter operates on the principle of continuous electrochemical reduction of oxygen on a cathode-polarized selective oxygen electrode. The special structure of the selective electrode ensures a reading of the device independent of nature, temperature, and total pressure of the gas mixture. A third electrode is included in the electrochemical cell (serving as the sensor), which makes it difficult for oxygen to travel between the selective electrode and the cell electrolyte, thus increasing the sensitivity of the electrochemical system and ensuring its quick entry into an operating mode. The built-in contours for protection of the electrochemical system guarantee continuous operation of the device without changing the sensor more than once per year. The working range of the device is 0.1 to 200 ppm. The device is designed for two-position control with a variable level, hysteresis, voltage output, and standard current output.

The Betatest OM-200 oxymeter is used for measuring and controlling traces of oxygen in gases in the production of pure substances, semiconductors, electronic elements, high temperature electrochemical current sources, in obtaining and processing metals and alloys, in the production of light fixtures and plastics, in organic and inorganic synthesis, and other applications.

At CLEPS, a series of 30 devices has been produced, 12 of which have been sold as separate scientific apparatuses to the academies of sciences in East Germany, Czechoslovakia, and Poland; the rest of them have been adopted in production processes at various enterprises around the country.

At the present time, the production of the device is being implemented at the Scientific Production Enterprise for Scientific Instrument Building at the Bulgarian Academy of Sciences, at its Plovdiv branch. A series of 50 devices is being prepared, designed mainly for the execution of orders from the academies of sciences of the member nations of CEMA.

Digital Electronic Hygrometer

Sofia SPISANIE NA BULGARSKATA AKADEMIYA NA NAUKITE in Bulgarian No 2, 1984 p 95

[Article: "Betatest NM-2000 Hygrometer"]

[Text] The Betatest NM-2000 digital electronic hygrometer was developed at the Central Laboratory for Electrochemical Power Sources (CLEPS) at the Bulgarian Academy of Sciences as an original device, protected by four patents (registration Nos 37911, 51111, 55166, 55167), and has been licensed for distribution in West Germany, East Germany, the USSR, Czechoslovakia, and Hungary. The design collective of the development is led by scientific associate V. Manev and scientific associate P. Andreev.

The device is designed for measuring the partial pressure of water vapor in superfine, inert, dry, and reduction atmospheres, such as, for example, nitrogen, air, hydrogen, argon, helium, carbon dioxide, and so forth. The operating range is from 1 to 2000 ppm.

The principle of the device's operation is electrochemical. The sensor element directly transforms the partial pressure of the water vapor into electric current, which is neutralized by the electronic component of the device so that the partial pressure of the water vapor is read digitally and directly in million volumetric units. The special design of the sensor element provides for reading the device's indicators, independent of natural conditions, general pressure and temperature of the gas mixture. A technology for making standard sensor elements has been created, and these sensors are capable of working continuously for more than 2 years.

The three-channel device is universal in its functions; it has a built-in analog-digital transformer with automatic gas zero correction, on-off control with a powerful relay output and regulated level, hysteresis, and voltage output. There is also current voltage, from 4 to 20 mA for plugging it into the standard devices of industrial electronics.

The Betatest NM-2000 hygrometer can be used for measuring and controlling traces of moisture in gases in the production of pure substances, semiconductors, electronic instruments, electrochemical power sources, in obtaining and processing metals and alloys, in organic synthesis, fuel production, plastics and lacquers, in high temperature inorganic synthesis, in the field of scientific research, and so forth.

A series of 40 devices has been produced at CLEPS, 18 of which have been sold as separate scientific apparatuses to the academies of sciences of East Germany, the USSR, Czechoslovakia, and Poland; the rest of them have been implemented in production processes around the country -- at the Neftokhim Economic Combine in Burgas, the Svetlina plant in Sliven, the Gavril Genov Chemical Economic Combine in Ruse, the Verila Biochemical Economic Combine in Sofia, the Vazovski Machine Building plants in Sopot.

The production of the Betatest NM-2000 is being adopted by the Scientific Production Enterprise on Scientific Instrument Building at the Bulgarian Academy of Sciences. A series of 50 devices has been produced, for distribution on foreign and domestic markets.

12334
CSO: 2202/12

MICROELECTRONIC COMPONENT PRODUCTION INCREASING

East Berlin DER MORGEN in German 22 Mar 84 p 5

[Article by Helga Borman: "Microelectronics Applied Widely: Production of Components Triples in 6 Years"]

[Text] In radiant color--and recognizable in form only on second glance--pictures of Ruegen and Hiddensee appear on a TV monitor. Next to it is a very much smaller monitor--also with a color picture--which has an operating unit with keyboard, a so-called terminal. In the background in much larger dimensions stands the computer that belongs to both of them. The total unit is called the A 6472 Image Processing System and it comes from the Robotron Combine.

"Such digital image processing systems are used for the rapid processing of images obtained by airplane, satellite or spaceship," we were told by Klaus Bernhard, a planner in the Berlin division of VEB Robotron. "The different variants of these systems represent a balanced combination of modern computer systems, special processors and use-oriented software."

New Microprocessor

In close collaboration with the GDR Academy of Sciences and the Soviet Telereconnaissance Center, Robotron has now developed a new display processor, which debuted internationally last week at the Leipzig Spring Exhibit as an example of numerous applications of microelectronics.

The reduction of production expenditure, the improvement of product quality and the consequent increase in exports would certainly not be possible without microelectronics. This key technology thus understandably occupies a central position in our economic strategy.

"In the new processor, the digitalized image--for example from a photograph taken by the MKF 6 for telereconnaissance of the earth--is broken down according to light intensity into coordinates (512 lines per image and 512 light points per line) and stored in memory," explains the mathematics expert. "This takes only 40 milliseconds; in other words, we can send 25 images per second through the processor for analysis."

Still Relatively New

This permits, for example, searching for natural resources, earlier detection of environmental damage, making of harvest forecasts and surface-use maps for agriculture, but the system can also be employed for urban planning and weather forecasting. In industry it is used in the automatic checking of non-destructive materials and in the monitoring of process functions. These applications fall far short of exhausting its possibilities. Used in medicine, the image processing system can, for instance, classify cells when the computer is programmed to recognize the characteristics of living and diseased cells.

Microelectronics in the GDR is still relatively new but extremely interesting. In 1978, the year of the founding of the microelectronics combine, the value of electronic components produced totaled 575 million marks; in 1983, the volume already exceeded 1.7 billion marks. In 1978, we produced 2,200 microprocessing units; 5 years later, this was 135,000 units! Last year, our national economy had 1,086 types of active components at its disposal--a specific expression of the close collaboration within the framework of socialist integration. Presently, between 60 and 80 new switching circuits are turned over to production annually. The application of microelectronics is thus being emphasized.

System recognizes Words

Another example of this is a new automatic system that reacts to the spoken word. It was developed jointly by Robotron and the Dresden Technical University. "Our LSE K 7821 Speech Recognizor consists essentially of a program disk as well as the operating unit and can store 50 different words," explains Gerald Weigert, a trained engineer at the research and development center of VEB Robotron in Dresden. "It can control robots and is very useful anywhere that hands or eyes are busy with other activities--for example, while using the microscope, in quality testing and in scientific-statistical analyses."

These examples eloquently testify to the all-around increased activities in using microelectronics, which with its stormy development contributes to the fulfillment of our high goals of efficiency in the economy, underscoring the determination to make the 35th anniversary of our republic a year of record achievements.

[Photo caption] Here too, microelectronics is in daily use: a bank work station for office and teller services

9992
CSO: 2302/50

PESTICIDE USED INCREASINGLY IN AGRICULTURE, FORESTRY

East Berlin DIE WIRTSCHAFT in German 1984 Leipzig Spring Fair Issue p 50

[Text] During the 70's, the state enterprise Chemical Combine Bitterfeld developed a pesticide which has found wide use as a weedkiller (herbicide) and for pre-harvest desiccating in agriculture, horticulture and forestry.

Trakephon is a pesticide which is ecologically harmless, has low toxicity and good storage qualities, high durability and favorable yield possibilities. It contains the substance Buminafos (for short), a phosphoric ester. The LD_{50} value of the ingredient, an important criterion for toxicological evaluation, consists of 7,000 mg/kg body mass of rat per os, so that there is no acute danger for humans and domestic animals.

Since the waiting periods between the last application of the substance and the harvest of plant products are very favorable, and since there is no residue of the substance exceeding the tolerance level if the waiting period for treated plants and contaminated soils is observed, Trakephon also can be applied unrestricted in this respect.

Since 1983, Trakephon has been produced in a large factory. This ensures a high degree of stable quality. Detailed instructions on the use of the product give the customers maximum product effectiveness.

In the GDR, there are specific licenses for Trakephon as an herbicide and desiccating agent. In recent years, many foreign scientific institutions have tested the product, and at present it is being introduced in several countries. Trakephon is of interest not only to farmers and foresters, but also to the professional and private gardener.

Trakephon is used as a herbicide in fighting annual monocotyledonous and dicotyledonous weeds produced by seeds. Its effect is predominantly through contact and is absorbed through the leaf. The weeds are best attacked in the seek leaf stage, up to the four-leaf stage. The results become visible as early as 3 to 5 days after the application. Cultivated areas thus treated remain free of weeds for several weeks.

In most of the areas of application, Trakephon is used in the pregermination or preplanting stage, i.e., before germination or planting of crops. However, some applications can also guarantee high economic success when used at a later stage, for example with sugar beets, fruit growing, including fruit tree nurseries, and in strawberry beds. The substance is then used, with the foliage protected, or after the harvest, respectively.

Trakephon can be applied during the entire growth period. Even several applications on the same area do not leave any residue in the soil which could harm a new growth of cultivated plants. Trakephon reduces mechanized or hand weeding to a large extent. This ensures or increases the yield of the treated plant.

Pre-harvest drying (desiccating) of the ripening agricultural, hotricultural and special crops is an important step toward the intensification of plant production. Trakephon can be applied successfully to dry the stalks of onions, hop sprouts, potato foliage, and agricultural or ornamental plants which serve for seed production. Drying ensures the even ripening of seeds, tubers, bulbs and umbels in a controllable time span. In addition to the advantages of harvesting techniques, better quality of the harvest, ensuring agrotechnically favorable dates for stock removal, soil preparation and planting of new crops, above all the yield is ensured.

At present, about 30 types of plants in agriculture, vegetable and ornamental plant growing can be treated with Trakephon for desiccation, with different production goals. It is also useful as a foliage killer in potato growing and for pruning and removing excess side shoots in hops.

These last-mentioned areas of use comprise a large part of Trakephon application in the GDR. A further advantage: Trakephon can be combined with other herbicides and driers. This increases the range of effectiveness; the amounts of combination substances used are reduced; and the economy of the procedure, i.e., use of Trakephon in combination with other substances on a certain crop, is improved. In some cultures, for example leguminous and ornamental plants, the very high amounts needed for desiccation can be reduced. Adding a wetting agent improves the effect.

Much work is still being carried out with Trakephon, both in research and in practice. There are constantly new findings. This modern substance contributes to the promotion of an intensive agricultural and horticultural production.

9917
CSO: 2302/55

BRIEFS

NEW PLOTTER INTRODUCED--Recently, the technical directorate of the Central Physics Research Institute of the Hungarian Academy of Science finished developing an up-to-date plotter. The Ipari Muszergyar [Industrial Instruments Factory] is preparing its facilities to manufacture it. The exact name of this device: two-penned digital drum plotter. The two pens draw in different colors. A drum with mesh teeth revolves and moves the paper along one axis of the coordinate system, while the pens move in a perpendicular direction. The graphs that can be prepared depend only upon the length of the automatically advanced paper, at least in one dimension; consequently, the graphs can be very large. The typical paper widths are 320,350 and 380 millimeters. The driving motors are controlled by a new type of circuit, so the smallest drawable length is a tenth of a millimeter, and the resume function is more accurate than .02 millimeters. The plotter can be directly connected to a computer, but in case it is needed, it can be controlled by a joy-stick. [Excerpts] [Budapest NEPSZABADSAG in Hungarian 26 Jun 84 p 10]

CSO: 2502/67

DEVELOPMENT OF OCEAN RESOURCES FOR FOOD DESCRIBED

Warsaw RZECZPOSPOLITA in Polish 9 May 84 p 4

[Article by Krystyna Forowicz: "Mariculture, the Great Hope"]

> [Text] Large white veils of plankton move in streams along the port-holes and give the impression of falling snow. We float up to the trawl. The fish swimming in align themselves evenly above one another, packed like the proverbial sardines. Pressing on the walls of the trawl, they make a circular cylinder on it. At this end of the travel no fish has a any more chance of escape . . . .

These are fragments of the log of the oceanologist Zbigniew Tkacz on his submarine observations of the Atlantic Gettysburg Bank fishing grounds during the voyage of the scientific research ship, the "Prof Siedlecki." He used the submersible "Delfin II," built by the Polish Association of Friends of Earth Sciences, for his work.

The secrets of the sea are discovered by using the entire gamut of modern technology. After all, it is difficult to reconcile oneself with the fact that the entire ocean provides scarcely 3 percent of our food. But before man can master its riches, he must learn to cultivate the sea; and this has not been done until recently. The currently popular term "mariculture" is nothing but a transition from fishing to cultivation.

Cultivating the Oceans

This comprises an entire gamut of intervention from increasing the survival rate of phytoplankton through the transplantation of high-caloric food organisms and artificial feeding, up to the construction of surface ecosystems, in order to obtain a final product with the lowest energy loss possible. thus skipping the intermediate links in the food chain.

Mariculture has only achieved specific momentum in the last decade. According to data from the FAO, world production from cultivation of the sea in 1975 amounted to about 6 million tons of meat from marine organisms; the plans are to increase it to 12 million tons in 1985 and to 30 million tons in 2000.

Gulfs, fjords, bays and shoals are reserved today for the artificial cultivation of fish, shellfish, crustaceans and algae. The Japanese shelf is sown with oyster beds, with one acre producing 30 tons of meat. On the western shore of Scotland flounder and eels are raised. Farms on the coasts of Finland annually produce 794 tons of rainbow trout, and 420 tons are produced annually in the GDR. Even the Australians, who are not very fond of seafood, take shrimp production seriously. This game is being played for high stakes. One acre of the sea devoted to mariculture produces a ton of fish. At the same time the same area of land enables the production of barely 50 kg of beef in a year.

Our Sea

The Baltic has a reputation of being difficult for mariculture. However, the work of scientists from the Maritime Fisheries Institute [MIR], the Institute of Oceanography in Gdansk, the Oceanology Department of PAN [Polish Academy of Sciences] in Sopot, which has been conducted for a dozen years or so, is producing concrete results. In the western part of the Baltic mussel and oyster cultivation is flourishing. However, the greatest successes are predicted for rainbow trout cultivation. Since 1976 the vicinity of the fishing port in Jastarnia has become an experimental area. About 1,500 kg of rainbow trout reach our tables from underwater cages made of steel on nets 60 cm in volume.

This species of trout is also cultivated in the protected part of Pucka Bay. It is estimated that 50 kg of fry produce about 150 kg of fish, and thus three times more meat. In time the harvests will be more abundant, according to the specialists. In the meantime, MIR scientists are trying to change the migratory instinct of the trout so that they will stay in the stocking area after being released from the cages. The scientists are also trying to adapt them to an environment of variable salinity. Work is also proceeding in choosing marine algae as food for young game fish. Polish research encompasses the entire southern Baltic from the Arkona Depth to the Gdansk Depth, and reaches up to the southern part of Gotland.

The MIR scientific workers have investigated more than 300 species of phytoplankton found in these areas. Studies of the fauna produce more and more awareness of the presence of previously unnoted and new species of marine animals.

For some time the Baltic has been producing more marine organisms and has revealed a constant tendency toward increased natural productivity. Prof Krystyna Wiktor of the Institute of Oceanography of the University of Gdansk has devoted her attention to a new phenomenon occurring in the Baltic waters. In step with the development of industry and the intensification of agriculture, the rivers flowing from the countryside have been feeding the surface waters with biogenic salts, mainly phosphates,

the result of which is an intensive development of microscopic green algae. These contribute to an increase in fish productivity. This is a positive effect, although temporary, of the ongoing eutrophication. The more remote effects of this phenomenon are unfavorable, and here the scientists are sounding the alarm. The advancing eutrophication is accompanied by negative phenomena. Contamination is worsening and in the near future, unless something is done to protect the sea, it will render the use of its food sources impossible.

Not Only Fish

Microscopic plankton, seaweed several centimeters long, and great thalli with a length sometimes exceeding 300 meters constitute the basic food base, set at approximately 550 billion tons per year. This is the food of the future for people. Dried vegetable plankton contains 24-50 percent protein, 2-10 percent fat, 30-60 percent mineral compounds, and has a composition reminiscent of rye flour. Animal plankton contains 70-80 percent protein, 4-20 percent fat, and can be used as a substitute for beef without hesitation.

For some years the Soviet Union has used algae in preserves, and it is eaten under the name of sea cabbage as a salad taste of delicate. The algae are harvested and processed into fodder by the Norwegians, Germans, French, English and Americans. The possibilities of expanding the cultivation and raising of the fruits of the sea are practically unlimited. However, can the sea withstand such multiple exploitation for a prolonged period of time? Everything depends on whether we are skilful enough to develop sea "cultivation," intensively similar to the current intensive cultivation of our soil. At present the sea needs help.

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NEW MEASUREMENT DEVICE FOR NUCLEAR-ELECTRIC POWER PLANTS

Bucharest CONSTRUCTIA DE MASINI in Romanian Jan 84 pp 25-29

[Article by Maria Stancu and Mihai Meiu, ICTCM, Bucharest]

[Text] As part of the program to manufacture in Romania the tools and instruments needed to produce equipment for nuclear-electric power plants (CNE), the Institute for Scientific Research and Technical Engineering for the Machine Building Industry (ICTCM) has created among other things, two measuring devices for the bodies and diaphragms of CNE turbines. They are:

A device for measuring the dimensions of welded turbine bodies; and

A device for verifying planarity and for machining reference planes on diaphragms.

Investigation has shown that such devices are built elsewhere, but not with the dimensions requireed by the user (1800 x 4500 mm for Y- and Z-axes, and 3000 mm arm).

The Opton company in FRG does make a three-coordinate measuring machine of the SMM type, with Y and Z displacements of 1600 x 2400 mm in the single support model, and 3200 x 2400 mm in the double support one.

POLI in Italy produces the POLI-TU model (1200 x 3000 mm), and Mitutoyo in Japan offers a wide range of three-coordinate machines with dimensions of up to 1300 x 2030 x 2630 mm.

Similar models are also built by Stiefelmayer in FRG and DEA.

All these models are characterized by high precisions, which vary from 0.001 mm to 0.1 mm depending on the size of the machine, and being computer controlled, by a high degree of automation as well.

This equipment is much too precise for the user's needs (0.1 mm) and does not meet the range of sizes required (1800 x 4500 mm for Y- and Z-axes). Moreover, it is very expensive as a result of its high precision and automation.

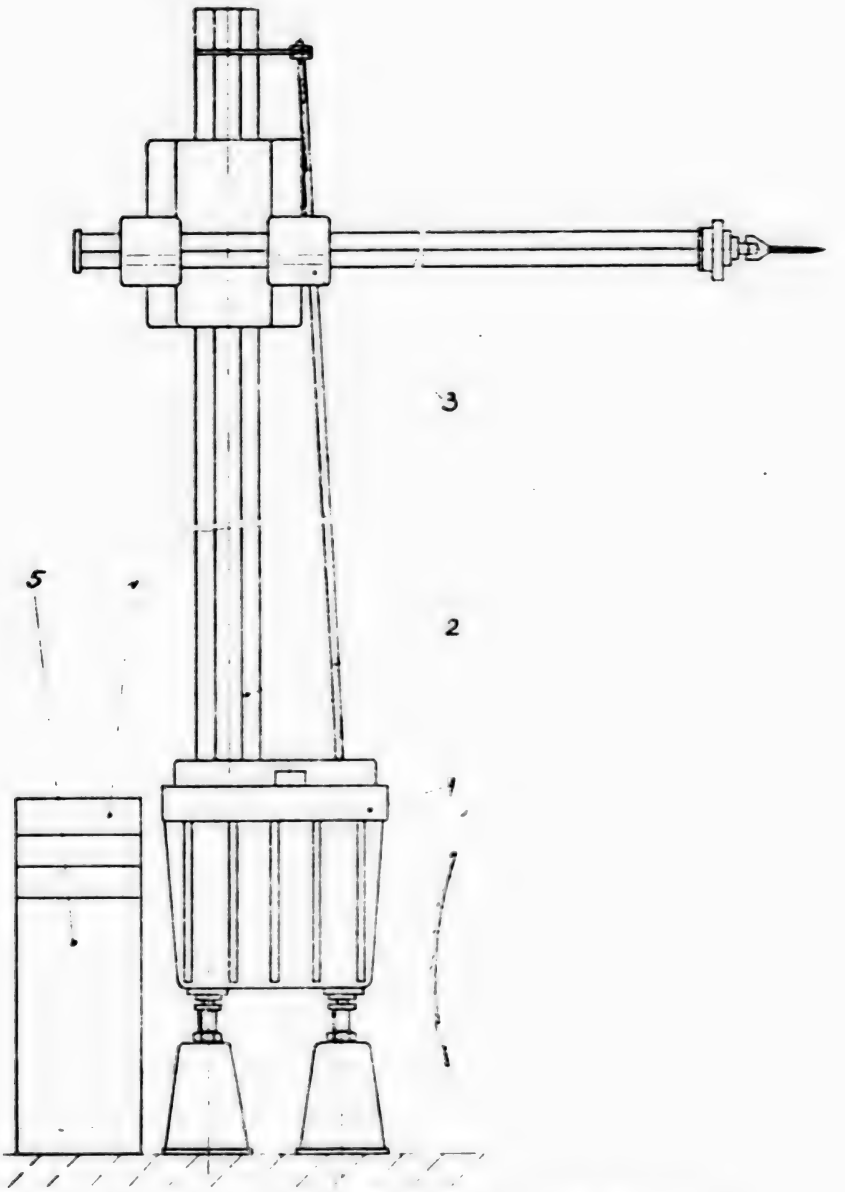

Fig. 1 Dispozitiv pentru controlul spațial al carcaselor sudate pentru turbine.

1 — suport axa X ; 2 — suport axă Z ; 3 — suport axă Y ; 4 — afisare numerică ; 5 — instalație electrică.

Figure 1. Device for measuring the dimensions of welded turbine bodies.

1. **X-axis support**
2. **Z-axis support**
3. **Y-axis suport**
4. **Digital display**
5. **Electrical installation**

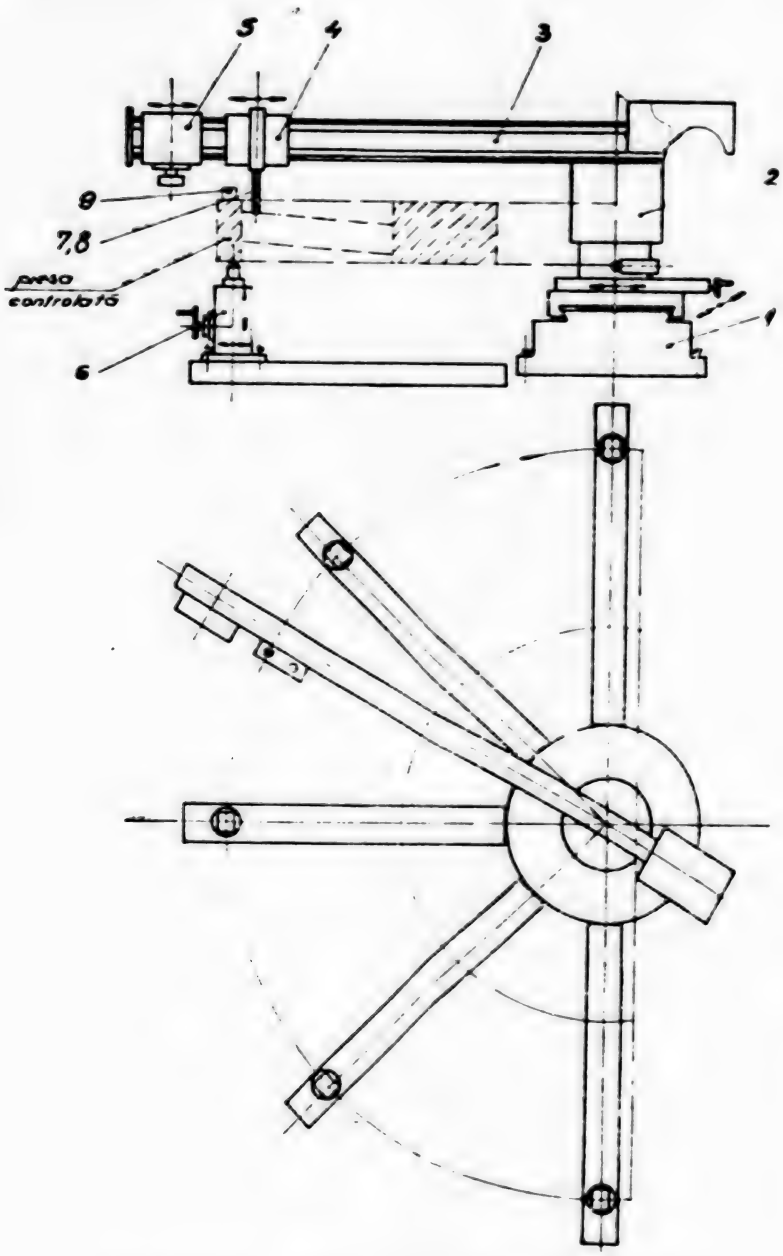

Fig. 2 Dispozitiv pentru controlul planeităţii şi prelucrare baze tehnologice pentru diafragme.
1 — suport ; 2 — lagăr ; 3 — braţ orizontal ; 4 — cărucior de măsurare ; 5 — cărucior de prelucrare ; 6 — cricuri hidraulice ; 7 — palpator ; 8 — dispozitiv pentru „pasaportizare" ; 9 — cep tehnologic.

Figure 2. Device to measure planarity and to create base planes for diaphragm processing.

1. Support
2. Bearing
3. Horizontal arm
4. Measurement carriage
5. Processing carriage
6. Hydraulic jacks
7. Sensor
8. "Passporting" device
9. Reference pin

Piesa controlata = Measured part

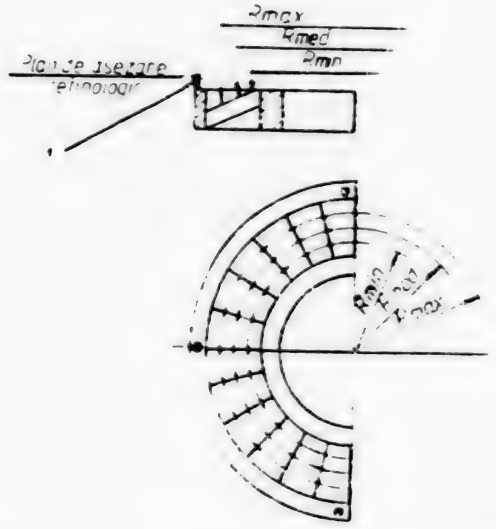

Fig. 3 Locul de efectuare a măsurătorilor pe diafragmă.
1. Cep tehnologic

Figure 3. Diaphragm measurement locations.
1. Reference pin
Plan de asezare tehnologic = Reference location plane

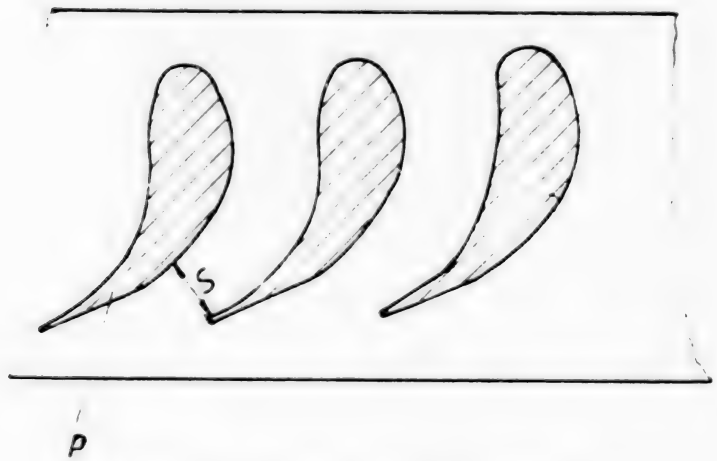

Fig. 4 Secțiunea de verificat pentru pașaportizare.
s — secțiune de trecere a aburului ; p — paleta.

Figure 4. "Passporting" verification cross section.
S = steam passage cross section
P = blade

The domestic production of similar equipment (without computers at first) has raised special problems.

Serious documentation and repeated studies were carried out with specialists at other institutes such as Titan ICSIT (Institute for Scientific Research and Technical Engineering), Bucharest IPA (Automation Design Institute), Bucharest CCSITMFS (expansion unknown), and Cluj Napoca ITIM (Institute for Isotopic and Molecular Technology), for the use of specific components such as: motion measurement and display devices, precise displacement systems, direct current motion devices, and so on.

We have sought to use components and devices fabricated in Romania, avoiding the use of imported equipment. Some of these are:

Recirculating ball bushings produced at Titan ICSIT;

Precision rack and pinions made by IMUAB (Bucharest Machine-Tool and Aggregates Enterprise);

Incremental rotation translator from CCSITMFS; as well as

Electronic display assembly produced by NUMEROM FEA (Factory for Automation Components).

The three-coordinate device shown in figure 1 is designed to trace and measure the dimensions of welded bodies that will be produced at the Bucharest IMG (Heavy Machinery Enterprise) for 700 MW CNE generator groups.

Due to the large size of the parts to be measured (8820 x 4035 x 3378) the measuring device for welded bodies created special problems associated on one hand with assuring appropriate rigidity for measurement precision, and with construction designs for guiding the measuring devices over large spans, and on the other hand with finding designs that will provide operator access to the measurement area, protect the sensing instrument, and position the operator's station so that the latter may operate all controls from any location.

The difficulties encountered above were solved by adopting Z- and Y-axis motions along columns with recirculating ball bushings, using screws which are turned by variable speed, direct current servomotors with built-in brakes, and which are controlled by an operator or from a control station.

Measurements are obtained with incremental rotation translators, together with pinions moving along precision racks. Readings are displayed on a NUMERON 507 electronic device.

Motion along the X-axis is achieved with a roller driver, and measurements are obtained with a vernier ruler.

Some of the major technical specifications of the instruments are:

Measurement range: X-axis 0 to 8500 mm
Y-axis 0 to 1800 mm
Z-axis 0 to 4500 mm
Precision: + 0.5 mm

The turbine body, which has a complex shape and weighs about 20 tons, is measured on a tracing table; the instrument, with a number of attachments, provides access to all areas of measurement.

The device substantially reduces the quality control manpower currently required for similar products (of smaller size) using conventional means. At the same time, it improves the measurement precision and implicitly, product quality.

The device for verifying flatness and for machining reference planes on diaphragms (figure 2), is used to check flatness and to create reference planes parallel to the plane of the turbine diaphragm blades, for subsequent processing (figure 3).

The major technical specifications of the device are:

Minimum diameter = 600 mm
Maximum diameter = 6000 mm
Measurement precision = 0.1 mm
Measurement instrument = incremental rotation translator and digital display assembly

As shown in figure 2, the device consists of a central support with two perpendicular slides and a horizontal arm mounted on a bearing.

A measurement and a processing carriage move along the arm. They are guided by recirculating ball bushings. The sensor slides along the measurement carriage.

The part to be measured is placed on an adjustable support composed of five hydraulic jacks.

The semi-finished diaphragms are placed on the support device adjusted to appropriate values; the device is centered by moving the two slides so that the axis of the central support is located at the axis of the part being measured.

The carriage is adjusted to the appropriate radius, locked in place, and the sensor is lowered to the first blade. The base level is marked as zero, and the other blades are measured differentially.

The operation is repeated at different radii (minimum, average, and maximum) depending on the part being measured.

The measurement readings are entered in control files. Depending on these results, the hydraulic jacks are moved to place the blades--and therefore the diaphragm--in a horizontal plane. Using the machining device on the carriage, all previously welded reference additions are processed. The operation is repeated until a completely processed surface is obtained for all the previously welded reference additions.

Another measurement performed with this device is "passporting," which consists of measuring a cross section for steam passage (figure 4). The sensor is replaced with a special device for this purpose.

The measurement results, transmitted by incremental rotation translators to a NUMEROM 507 digital display assembly, are processed and appropriate corrections are made to the part.

As with the previous device, the effects of using this modern equipment are a significant reduction in preparation and control manpower, a substantial increase in product quality, as well as reduced importations and shorter preparation times spent on the machine used to process these parts, on which this operation is sometimes performed at present.

The device is designed to be connected to a computer, so that file recording and data processing can be carried out automatically.

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DEVELOPMENT OF AUTOMATION INDUSTRY REVIEWED

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[Article by G. Bratescu]

[Text] Since the inception of the Automation Design Institute [IPA], stresses research worker Rodica Draghicescu, its task involved creating an automation industry, nonexistent in those days. During two decades, based on the Romanian concept, the Industrial Central for Telecommunications and Automation Equipment CIETA has provided the needed amount of automation equipment required domestically, in a proportion of 93-95 percent. Today's modern institute has managed to win reputation for the name IPA (its trademark) in very many foreign countries. After the groping and difficulties inherent in beginnings, in the context of the constant support given by the party and state leadership the creative force of the collective of researchers and designers has grown and unique solutions have been found more and more often. Practically, throughout this period, in light of the requirements of the economy and the creativity of the institute, the orientation and major effort of technical progress in the concept and production of automation equipment involved the achievement and utilization of components created and turned out at home, that would permit, in the context of performance and reliability, the replacement of imported makes. Attainment of the goal to meet the needs of all the economic branches required a concept of automation equipment concretized in "Systems for Automation Components and Equipment" that practically covers the entire area of automation equipment, from primary elements, such as transducers for parameters of processes, up to the modern systems of hierarchical control of processes by means of computer technology. The concept of automation equipment achieved by the institute follows the most advanced world trends, the current issues mainly involving miniaturization and modulization of equipment, use of digital technology and respectively of miniprocessors, rise in reliability and safety in operation, ensuring of a competitive level in terms of technique and price in the world. Moreover, our institute is involved with the issues of department institutes, helping to resolve their most intricate problems. Furthermose, it cooperates with the units of our industrial central and with specialized chairs of higher education, including those in Bucharest, Cluj-Napoca, Brasov and Craiova.

Achievement of World Prestige

The recent accomplishments of the institute, says Engr. Dan Apostolescu, section head, includes the SDC control distributed system, an ultramodern system, so far created only in industrially developed countries, whose first application is in the process of finalization at the Bucharest Enterprise for Kinescopes, where it ensures automatic control of all the production process. In the area of sequential control equipment, the last 3 years saw the replacement of prior USILOG static switching systems with a new generation of programmable automatic switches, a family that is being developed now in conjunction with Bucharest "Automatica" Enterprise, which produces the series AP-100, AP-200, Mini-AP and very recently, Micro-AP, designations which tellingly illustrate the trend toward miniaturization and also toward reducing the price for automation equipment. In the area of control of revolution of electric motors it must be pointed out that all the controllable electrically powered machines needed by the economy have been created by our institute and produced at the modern Bucharest "Electrotehnica" Enterprise. A large volume of these facilities also are being exported, a fact that attests to the prestige enjoyed by these products on the foreign market, where they competes with very well known counterparts. All the Romanian machine-tools are provided with speed variators for principal powering and advance, as well as electric powering adjustable up to powers of 5 MVA used in the chemical, metallurgical and construction materials industries. Regarding one of the basic problems of modern industry -- provision of high-standard machine-tools -- IPA has a section specialized in creating equipment to control these machines. For instance, the equipment for digital control of machine-tools in the NUMEROM family is provided on all Romanian-made machine-tools. In light of the high intricacy of this equipment, the institute ensures not only the conception but also the realization of small lots until an arrangement is made for their production in major enterprises of CIETA. For control of industrial processes by automatic means, IPA has created the family of ESCAROM computers used at home and abroad. For both process computer-based control systems and the network of general-purpose computers, IPA developed the family of automatic data teletransmission and teleprocessing equipment designated as TELEROM.

An area recently tackled by IPA under the program for upgrading product quality involves computer-based automatic testing equipment for components and subassemblies in the production of automation facilities and by and large in the electronics industry, concretized by the THETA Program. So far about 10 automatic testers totally turned out by the Cluj-Napoca branch of the institute have proved their usefulness in raising labor productivity and product quality in many enterprises that produce electronics equipment, and such a machine has been operating for more than a year now in East Germany to the importers' full satisfaction. The entire collective has been instrumental in completion of all our projects. But emphasis must be placed on the inventors' input. For instance, during last year OSIM [State Office for Inventions and Trademarks] patented 12 inventions and for another 10 patents arrangements were made for production.

Broader and broader integration of computer-based control systems also requires an increasing volume of software programming (the part of intelligence without which the entire computer control system could not operate) which is principally ensured by the research and design section together with the institute's computer center.

The facilities created by our institute are present in all Romanian major industrial units whose automation systems and installations were produced on the basis of IPA designs, and also in many complex factories and installations exported by Romania to more than 20 countries. Among these are the cement factories in Syria, Irak, Pakistan, China, Yugoslavia,and Bulgaria, the petrochemical and chemical installations in Syria, Pakistan, USSR, and China, the thermoelectric power plants in East Germany, Egypt, USSR and Turkey; the automation facilities in agriculture and the food industry in Irak, Iran, China, Libya and Algeria. The enumeration could continue.

The process computer at IPA helps to check the basic and applied programs of automatic control systems for technologies in various units, resulting in the integration of all the system (hardware-software). The photo (not included) shows a process computer system for checking programs developed by IPA.

Toward Year 2000

Engr Aristide Predoi, director general of this institution, told us about the projects of the institute: During the subsequent period we shall continue the process of restructuring the advanced processing branches, the development of sophisticated products which use low amounts of energy but put to better use materials and components, incorporating in a small volume a great volume of intelligence and highly skilled manpower. The electronics and electrical engineering industries, also, will greatly expand. Proceeding from these guidelines, based on research and engineering our institute aims at predominantly achieving the intensive electronization of automation facilities by development of new generations of miniaturized products, in step with the new generations of (micronic and submicronic) components that use low amounts of energy and also permit reduction of materials use. Moreover, there will be more emphasis on increasing the level of automation for the purpose of raising the efficiency of machines and installations, improving labor productivity, cutting consumption rates for materials, energy and fuels, improving working and living conditions in all the economic branches. In the electronics and electrical engineering sector it is expected that the automation facilities will account for a proportion of more than 10 percent, with a 75-80 percent increase in the input of domestic research during the period 1985 and perspective 1990-2000. The major directions and objectives of research and development that will ensure nearing the level of developed countries and joining the medium-developed countries involve wide-scale integration of microprocessors and other electronics components, evolved in such a manner as to obtain the marked increase in the performance/cost ratio, improvement in quality for the purpose of upgrading reliability by tackling the programming problem of technological flow and computer-based automatic testing facilities, prefiguring new unconventional systems of applications of automation. Among these I point out the man-computer conversational systems, the self-diagnosing automatic systems, the automation

and information transmission systems based on laser and optical fibers, automation systems for utilization of new energy sources (nuclear, solar, eolian, maritime and geothermal ones), automation systems for raising the efficiency of mining equipment, transportation and storage facilities, of oil and gas fields. Tackling of such directions and objectives of research and achievement of new systems of automation facilities will be correlated with production facilities so that output for 1985 will be obtained in a proportion of 90 percent by expansion and restreamlining of existing enterprises. Furthermore, integration of new, modernized processes, such as those pertaining to production of multilayer interwoven cabling, flexible cabling, self-fastening flexible flat cables, signal transmission based on optical fibers, control systems with push buttons and static keys instead of electromechanical ones, will create conditions for obtaining a double production volume in 1985, with materials and energy use reduced 50 percent on the average.

Photo Captions

Moreover, the next period will see more emphasis on standardization, ensuring the organic integration of automation and computer facilities into the units of the systems of machines and installations standardized on the technologies in the basic branches of industries (metallurgical, chemical, machine building, construction materials, power and other industries) and of special programs of outstanding importance (power, nuclear, sea drilling, mining, transportation and so forth).

The picture shows an apparatus that can erase computer memory by means of ultraviolet rays. The apparatus was designed and produced in the microproduction section of IPA. Until recently such apparatuses were produced only by reputed foreign firms. Research conducted by IPA scientific workers resulted in obtaining a simple and efficient and internationally competitive product, that is necessary to every electronics enterprise, which uses microprocessor and programmable memory technology.

TELEROM P is an "intelligent" terminal. The facility (shown in the picture) was designed by IPA experts and arrangements for its production were made at the Cluj-Napoca Enterprise for Industrial Automation Components. The terminal is used in teletransmission and teleprocessing of data. Hence, the users are enabled to benefit by the power of a single computer installed at a particular center. The terminal can be used in control of industrial processes, questioning of data banks, in scientific and technical calculations, technical-economic control, training of personnel, and so on.

REH-76-M is the designation of an electrohydraulic regulator designed and produced in small lots at IPA. The facility is used in hydroelectric power plants where it automatically ensures control and adjustment of functional parameters of the energy generator (turbines). The regulator is a Romanian success, because such complex apparatuses are turned out by few companies in the world. It is a product which also is sought after abroad.

This is an apparatus called Testor F D 5053 (THETAROM), designed and made by IPA branch in Cluj-Napoca (pictured above). It is designed for testing plates fitted with analog and logical circuits. THETAROM has a modular structure, including a Romanian Felix M-18 computer, analog and interface units, operating in programming language "LITEST II." The apparatus is delivered to domestic and foreign users with the related programs.

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